## REMARKS

Claims 1-3, 5-24 and 26, as amended, and new claims 27-28 appear in this application for the examiner's review and consideration. In particular, claim 1 has been amended to further define the invention by reciting that the stiffening layer is grown on the front face of the base substrate to a thickness of approximately 1 to 10 micrometers (as supported by paragraph [0034] of the published application) and that a high quality homo-epitaxial or hetero-epitaxial film is grown on the stiffening layer (as supported by paragraph [0037] of the published application).

Claim 3 has been amended to incorporate part of claim 4 and claims 3, 20, and 26 have been amended to be consistent with amended claim 1. Claims 4 and 26 have been cancelled.

New claims 27 and 28 have been added to cover preferred embodiments. Claim 27 is supported by paragraph [0045] while claim 28 is supported by paragraph [0035]. As no new matter has been introduced by any of the claim changes or additions, they all should be entered at this time.

The claims have been rejected as being anticipated or obvious over US patent 6,150,239 to Goesele et al. ("Goesele") for the reasons set forth on pages 2-3 of the office action.

Goesele discloses a method for transferring of monocrystalline thin layers from a first monocrystalline substrate onto a second substrate. Ions are implanted to form a weakened zone with a reduced requirement with respect to the hydrogen dose needed for layer splitting realized by co-implantation of hydrogen-trap inducing ions with hydrogen ions, by the high temperature implantation of hydrogen, and by their combination. The implantation is followed by a heat-treatment to weaken the connection between the implanted layer and the rest of the first substrate, then forming a strong bond between the implanted first substrate and the second substrate and finally using another heat-treatment to split the monocrystalline thin layer from the rest of the first substrate by the formation and growth of hydrogen filled microcracks in the weakened zone.

Goesele's method allows the transfer of the thin layer at lower temperatures than the prior art. Although either substrates can be covered by one or more surface coating layers, this optional step is conducted prior to the implantation of the atomic species, since to do so otherwise would cause splitting to occur. Goesele's goal is to transfer the thin layer at relatively low temperatures in order to minimize degradation in the splitting zone. The thin layer is detached at a temperature at which the two substrates, after they have been bonded, do not suffer

from any degradation, especially degradation in one or both substrates or due to the mechanical stresses between the first and the second substrate caused by a difference in the thermal expansion coefficients during the heat-treatment during the transfer process.

Goesele does not disclose or teach the method steps of claim 1. In particular, Goesele does not disclose or teach that a stiffening layer should be grown to a thickness of approximately 1 to 10 micrometers on the front face of a base substrate that includes a weakened zone. This step allows the formation, after splitting, of a sufficient structure of stiffening layer and carrier sublayer to enable the carrier substrate to be free-standing and capable of supporting the structure as it is moved and subjected to subsequent processing steps. The stiffening layer growth is initially conducted at a low temperature so as to not affect the weakened zone and then is completed at a higher temperature that also causes the detaching to occur. In contrast, Goesele instead optionally grows a layer upon the substrate (on the useful layer) prior to implanting or formation of the weakened zone. In each embodiment Goesele discloses implantation of ions into the substrate as a "first step," and there is no disclosure of how to apply further layers without causing splitting in the weakened zone. In fact, as Goesele teaches that the temperature at which splitting occurs is lower than is known in the art, this further teaches away from the present invention in that even less heat is needed than in the prior art to cause splitting.

In addition, the present invention leads to unexpected benefits over what is disclosed by Goesele. The present invention teaches that the growth of the stiffening layer to a thickness of approximately 1 to 10 micrometers serves a number of purposes. First, the initial growth of this layer provides in effect a seal that prevents the quality of the surface of the stiffening layer from deteriorating at or after the point when the carrier substrate is detached from the remainder of the base substrate. It also provides a sufficient thickness that, in combination with the thickness of the sub-layer, creates a carrier substrate that is free-standing to allow subsequent processing. Usually, the stiffening layer is applied by any deposition method leading to epitaxial growth, but growth by molecular beam epitaxy (MBE), metal-organic chemical vapor (MOCVD), hydride vapor phase epitaxy (HVPE) or sputtering is particularly suitable.

Goesele's process does not contemplate growing a high quality homo-epitaxial or hetero-epitaxial film on the stiffening layer to form a carrier substrate. The present invention provides an epitaxial or heteroepitaxial film on the stiffening layer. As the carrier substrate is detached from the remainder of the base substrate, the crystalline quality of this film is very good as it is

applied upon the previously grown stiffening layer. Defects due to the stress in the film can be minimized. Furthermore, any negative effects of the sub-layer of the carrier substrate can be ignored, as the thickness of the film can be chosen to be significantly thinner than that of the stiffening layer. This means that the carrier substrate behaves like a bulk substrate of the material of the stiffening layer and that the thickness of the film is not limited. It is even possible to grow a film with a laterally variable thickness. This is because the carrier substrate does not impose limitations on the structure or thickness of the film. This enables the present process to be applied, for example, to grow mono-crystals of excellent quality, or to provide heterostructures that can produce devices such as laser diodes.

Goesele's disclosure does not teach and would not motivate a skilled artisan to provide these advantages, nor to follow what is presently recited in claim 1. As the other claims all depend directly or indirectly from claim 1, the rejection based on Goesele has been overcome and should be withdrawn.

Finally, applicants are aware of US patent application 2005/0217565 but note that it is not prior art to this application as it has an effective filing date that is after the filing date of applicants' priority application. The Examiner is invited to review that application to confirm that it is not prior art to this one and that it does not contain interfering subject matter.

In view of the above, it is believed that the entire application is now in condition for allowance, early notice of which would be appreciated. Should the Examiner not agree with applicant's position, then a personal or telephonic interview is respectfully requested to discuss any remaining issues in order to resolve them and expedite the eventual allowance of this application.

Respectfully submitted,

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Date: 3/20/06

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